Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PUBLIC HEALTH REPORTS

VOL. XXVII. MAY 24, 1912. No. 21.

EXAMINATION OF EXCRETA FOR TYPHOID BACILLI.

By L. L. LUMSDEN and A. M. STIMSON, Passed Assistant Surgeons, Public Health and Marine-Hospital Service.

It is now well known that some persons recovered from typhoid fever continue to discharge typhoid bacilli in their urine or feces, or both, for weeks, months, or even years. Numerous outbreaks of typhoid fever in recent years have been definitely attributed to infection derived from typhoid bacillus carriers. The importance of keeping under observation persons recovering or recovered from clinical typhoid fever until their excreta have been examined bacteriologically with negative results is obvious. As there may be some intermittency in the discharge of typhoid bacilli in the excreta at least two specimens, and preferably four specimens, of the excreta collected on occasions several days or a week apart should be examined and found negative for typhoid bacilli before the convalescent is discharged from observation.

Numerous methods for the isolation of typhoid bacilli from excreta are in use. None can be regarded as perfect. Believing that it will be of interest to health officers, hospital authorities, and others having charge of typhoid convalescents, the following description of the technique now employed as a routine at the Hygienic Laboratory is presented:

METHOD OF EXAMINING FECES FOR TYPHOID BACILLI.

Place about 5 grams of the feces in a conical glass or other suitable vessel, add 15 or 20 cubic centimeters of sterile physiological salt solution or bouillon and agitate. Let stand one-half to one hour either at room temperature or, preferably, at incubator temperature (37° C.) in order to permit the heavy particles to settle. Deposit one or two drops of the supernatant fluid in the center of an Endo plate. With a right-angled glass rod distribute the drop over the entire surface of the plate and then rub the rod over the surface of a second, third, fourth, and fifth Endo plate. By carrying the spreader over the surfaces of several plates in this way, one or two of the plates will furnish abundant but sufficiently isolated colonies to permit "fishing."

After inoculation place the plates inverted in the incubator, leave there for 20 to 24 hours, and then examine. On the plates colonies of typhoid and paratyphoid bacilli will be transparent, colorless, dewdrop-like and usually from 1 to 2 millimeters in diameter; while colonies of colon bacilli will be deep red, showing sometimes on the surface a sheen from precipitation of the fuchsin, and measure usually from 3 to 4 millimeters in diameter. If typhoid-like colonies appear on the plates fish 5 or 6 of them, and inoculate tubes of Russell's medium in the following manner:

Touch the colony with a sterilized platinum needle, make two streaks along the slanted surface of the medium in the tube and then stab the needle down through the center of the block of medium to the bottom of the tube. Incubate the inoculated tubes of Russell's medium for 20 to 24 hours and then examine.

On Russell's medium inoculated in this way typhoid bacilli leave the surface of the medium blue but change the medium in the butt of the tube to a bright red; colon bacilli redden both the surface and the depths of the medium and cause the formation of gas bubbles throughout the depths of the medium; paratyphoid bacilli leave the surface blue, but produce redness and gas bubbles in the butt of the tube; dysentery bacilli leave the surface blue and change the medium in the butt of the tube to claret color quite readily distinguishable from the brighter and more pronounced redness produced by typhoid bacilli.

If any of the tubes of Russell's medium inoculated with suspected colonies from Endo plates show a typhoid-like growth, suspend some of the surface growth in physiological salt solution and test with typhoid agglutinative serum of a known titre for stock cultures of typhoid bacilli. Since typhoid bacilli just isolated from excreta may not agglutinate in as high dilutions of agglutinative serum as will stock cultures,[1] the test for agglutination should be made with several comparatively low dilutions of serum before deciding that it is negative. If the culture responds positively to the agglutination test, plate out some of the growth from the tube of Russell's medium, in order to obtain the organism in pure culture and then carry the organism through the various cultural and other tests required to establish positively its identity. If the colonies on Endo medium and the growth on Russell's medium suggest paratyphoid, the growth should be tested with paratyphoid agglutinative serum.

METHOD OF EXAMINING URINE FOR TYPHOID BACILLI.

Deposit 3 drops of the urine on an Endo plate spread with a right-angled glass rod; then rub the rod over the surface of a second and third Endo plate. For the remaining steps in the examination proceed as described above for the examination of feces.

DIRECTIONS FOR MAKING ENDO PLATES.[2]

Make stock agar of the following formula:

Water	cubic centimeters..	1,000
Agar, powdered	grams..	40
Sodium chloride	do....	5
Liebig's extract of meat	do....	10
Peptone, Witte's	do....	10

---

[1] Sawyer, A. W., Journal American Med. Assn., Vol. LVIII, No. 18, May 4, 1912, p. 1336.

[2] Endo, S.: Cent. f. Bakt., vol. 35, No. 1, 1903–4, p. 109. Klinger: Arb. a. d. Kais. Ges-Amt., 1906, p. 521 (see also Herford). Willson: Journ. Hyg., 1905, p. 429. Clauditz: Hyg. Rundsch., 1904, vol. 14, p. 718. Herford: Arb. a. d. Kais. Ges-Amt., 1906, p. 62. Kayser: Munch. Med. Woch., 1906, p. 823. Kendall: Journ. Med. Research, 1911, vol. 25, No. 1, p. 95.

Cook in Arnold sterilizer for three hours. Clear by vacuum filtration or by cooling in a smooth cylindrical or conical container, turning out the solid agar, and cutting off the part containing sediment. It is sometimes necessary to repeat the clearing process.

Neutralize to litmus paper with sodium carbonate solution. Add 3.7 cubic centimeters sterile 10 per cent anhydrous sodium carbonate (Na_2CO_3) solution. Put up the medium in quantities of 100 cubic centimeters and 200 cubic centimeters in flasks having a capacity of at least 150 cubic centimeters and 250 cubic centimeters, respectively. Plug mouths of flasks with cotton, tie paper caps over mouths of flasks to prevent evaporation, sterilize and keep these flasks of medium in stock ready for use.

The remaining steps in the making of the plates should be postponed until a specimen is to be examined. One hundred cubic centimeters of the medium will make about 5 plates. If 10 or 12 plates are desired for use, proceed as follows: Place one of the flasks containing 200 cubic centimeters of the medium in the Arnold sterilizer and let boil until the medium is completely melted. This usually takes about 1 hour. Add 2 grams of powdered lactose (C. P.) to 20 cubic centimeters of water in a test tube and dissolve by boiling in sterilizer for about 15 minutes. To 10 cubic centimeters of water in another test tube add 0.25 gram of anhydrous sodium sulphite (C. P.), and 0.7 cubic centimeter of a saturated solution of basic fuchsin in 95 per cent alcohol[1] and heat in Arnold sterilizer for about 15 minutes. Add to the flask of melted agar the lactose solution and the sodium sulphite fuchsin solution. Gently agitate the flask to secure thorough mixing of the contents and heat in the sterilizer for about 5 minutes. Pour the medium into the plates while it is steaming hot. Leave the Petri dishes in the incubator with covers off for about one-half hour to get rid of surface moisture.

The plates, after hardening, should be nearly colorless to transmitted light, and rose or flesh colored to reflected light. In a cold, dark place they will keep for several days.

DIRECTIONS FOR MAKING RUSSELL'S MEDIUM.[2]

Add to 2 per cent nutrient agar, such as is used for routine bacteriological culturing, enough of a 5 per cent aqueous solution of litmus to give the medium a distinct purple-violet color. Adjust the reaction of the medium by adding normal sodium hydrate solution until the mixture is neutral to litmus. Add 1 per cent of lactose and one-tenth of 1 per cent of glucose dissolved in a small amount of hot water and tube the medium for slants. Place tubes loosely in sterilizer basket and cook in the Arnold sterilizer for 10 minutes on the first day and for 15 minutes on the second day. The heating of the medium must not be carried too far, on account of the danger of breaking down the lactose. After the final sterilization, slant the tubes until the medium has become solid and store in a dark, cool place, such as ice chest or laboratory cold room.

---

[1] The saturated solution of fuchsin (about 4 per cent) may be kept in tightly stoppered bottles as a stock solution, but should be filtered immediately before use.

[2] Russell, F. F., Jour. Medical Research, Vol. XXV, 1911, p. 217.